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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,751	05/02/2001	VanWinkle (Van) T. Townsend	FE-00494 (L250.109.101)	6075

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EXAMINER	
CHAN, ALEX H	

ART UNIT	PAPER NUMBER
2633	3

DATE MAILED: 01/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/847,751	TOWNSEND, VANWINKLE (VAN) T.	
	Examiner	Art Unit	
	Alex H Chan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 12-15, 19-21 and 25** are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,796,504 to Sonderegger et al (hereinafter Sonderegger).

Regarding claims 12-13, Sonderegger discloses a system for remotely retrieving data (Fig. 2) from an array of sensors (35), the system comprising: an optical source (24) for generating a stream of optical pulses; an optical splitter (30) for splitting the stream of optical pulses into a plurality of streams of optical pulses (via 32 and Col. 4, lines 25-30); a plurality of optical modulators (36), each optical modulator configured to receive one of the plurality of streams of optical pulses, each optical modulator configured to receive sensor information (via 35) from at least one of the sensors, each optical modulator configured to modulate the received stream of optical pulses based on the received sensor (e.g. acoustic sensors, 34) information (e.g. by outputting an intensity modulated signal via 34, Col. 4, lines 31-39) and thereby generate a modulated stream of optical pulses; an optical combiner (38) for receiving a modulated stream of optical pulses from each of the optical modulators (Col. 4, lines 42-45) and combining the modulated streams of optical pulses into a combined modulated stream of optical pulses (Col. 4, lines 48-51); and an optical receiver (50) for receiving the combined modulated stream of optical pulses (Col. 4, lines 59-64).

Regarding claim 14, Sonderegger discloses the system is an underwater acoustic telemetry system for use in a submersible vehicle (Col. 2, lines 29-33 and Col. 11, lines 7-9).

Regarding claim 15, Sonderegger discloses the optical splitter is a passive optical splitter, and wherein the optical combiner is a passive optical combiner (Col. 11, lines 10-13).

Regarding claims 19 and 25, Sonderegger discloses each optical modulator modulates the received stream of optical pulses by passing and blocking optical pulses in the received stream (e.g. by varying the voltage so as to keep the modulator in linear portion of its transfer function, Col. 5, line 55-Col. 6, line 37).

Regarding claims 20-21, the limitations introduced by claims 20-21 correspond to the limitations introduced by claims 12-13. The treatment of claims 12-13 reads on the corresponding limitations of claims 20-21.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,628,493 to Nelson et al (hereinafter Nelson) in view of U.S. Patent No. 5,815,295 to Darcie et al (hereinafter Darcie).

Regarding claim 1, Nelson discloses a telemetry system (Fig. 1) comprising: a plurality of acoustic sensors (HYDROPHONE SUBARRAY-1) for receiving acoustic information and generating analog signals (e.g. by deriving analog samples of sensor signals) based on the received acoustic information (Col. 21, lines 15-23); a first plurality of subsystems (TM-N, TM-2 and TM-1) coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals (via 54 of Fig. 3 and Col. 10, lines 3-19) from the acoustic sensors and generate digital values (via 56 and 50 of Fig. 3 or 50 of Fig. 7, Col. 10, lines 21-24 and Col. 1, lines 45-48) based on the received analog signals. He does not disclose a first optical splitter; a first optical transmitter for transmitting a first set of optical pulses to the first optical splitter, the first optical splitter configured to transmit the first set of optical pulses to each subsystem in the first plurality of subsystems, each subsystem in the first plurality of subsystems configured to modulate the first set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream; a first optical combiner for receiving and combining the modulated optical pulse stream from each subsystem in the first plurality of subsystems, thereby generating a combined modulated optical pulse stream; and a first optical receiver for receiving the combined modulated optical pulse stream

from the first optical combiner, the first optical receiver configured to generate electrical signals based on the received combined modulated optical pulse stream.

Darcie discloses a first optical splitter (90 of Fig. 5); a first optical transmitter (20 of Fig. 5) for transmitting a first set of optical pulses (e.g. λ_1-λ_4) to the first optical splitter, the first optical splitter configured to transmit the first set of optical pulses to each subsystem (ONU 100 of Fig. 5) in the first plurality of subsystems (ONU 100-400 of Fig. 5), each subsystem in the first plurality of subsystems configured to modulate (via 115) the first set of optical pulses based on the generated digital values (via 120 of Fig. 5) and thereby generate a modulated optical pulse stream; a first optical combiner (90) for receiving and combining the modulated optical pulse stream from each subsystem in the first plurality of subsystems, thereby generating a combined modulated optical pulse stream (output to 12); and a first optical receiver (40 of Fig. 5) for receiving the combined modulated optical pulse stream from the first optical combiner, the first optical receiver configured to generate electrical signals based on the received combined modulated optical pulse stream (Col. 10, lines 18-20). Accordingly, one of the ordinary would have been motivated to employ the above means for providing a simple data connection between terminal equipment and a computer system or the provisioning of video or multimedia services (Col. 4, lines 44-48). Therefore, it would have been obvious to one of artisan from the same endeavor at the time the invention was made to modify the sensor system with time division multiplexing telemetry of Nelson by incorporating the above means because this provides a simple data connection between terminal equipment and a computer system or the provisioning of video or multimedia services as taught by Darcie.

5. **Claims 1-11, 16-18 and 22-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonderegger in view of Nelson.

Regarding claim 1, Sonderegger discloses a telemetry system (Fig. 2) comprising a plurality of acoustic sensors (35) for receiving acoustic information and generating analog signals (e.g. electrical signal, Col. 3, lines 53-55) based on the received acoustic information; a first optical splitter (30); a first optical transmitter (24 of Fig. 2) for transmitting a first set of optical pulses to the first optical splitter (30 of Fig. 2), the first optical splitter configured to transmit the first set of optical pulses to each subsystem (E-O AS_{11}, E-O AS_{12} or E-O AS_{1m} of Fig. 2) in the first plurality of subsystems, each subsystem in the first plurality of subsystems configured to modulate the first set of optical pulses based on the generated digital values (e.g. electrical signal, Col. 3, lines 53-55) and thereby generate a modulated optical pulse stream (Col. 3, lines 55-60); a first optical combiner (38) for receiving and combining the modulated optical pulse stream from each subsystem in the first plurality of subsystems, thereby generating a combined modulated optical pulse stream (Col. 4, lines 42-45); and a first optical receiver (50) for receiving the combined modulated optical pulse stream from the first optical combiner, the first optical receiver configured to generate electrical signals based on the received combined modulated optical pulse stream (Col. 4, lines 59-64).

He does not explicitly disclose a first plurality of subsystems coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals.

Nelson discloses a plurality of acoustic sensors (HYDROPHONE SUBARRAY-1) for receiving acoustic information and generating analog signals (e.g. by deriving analog samples of sensor signals) based on the received acoustic information (Col. 21, lines 15-23); a first plurality of subsystems (TM-N, TM-2 and TM-1) coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals (via 54 of Fig. 3 and Col. 10, lines 3-19) from the acoustic sensors and generate digital values (via 56 and 50 of Fig. 3 or 50 of Fig. 7, Col. 10, lines 21-24 and Col. 1, lines 45-48) based on the received analog signals. Accordingly, one of the ordinary would have been motivated to employ the above subsystems configured to receive analog signals and generate digital value based on received analog signals so as to provide oversampling which reduces timing errors and makes possible the elimination of sample and hold circuit and anti-aliasing filters in the array and that to improve the method for data acquisition with large sensor arrays wherein data is effectively and efficiently acquired (Col. 2, lines 52-61). Therefore, it would have been obvious to one of artisan from the same endeavor at the time the invention was made to modify the telemetry system of Sonderegger by incorporating subsystems for receiving analog signals and generating digital value based on received analog signals because this provides oversampling which reduces timing errors wherein data can be effectively and efficiently acquired as suggested by Nelson.

Regarding claim 2, Sonderegger discloses the telemetry system is an underwater acoustic telemetry system for use in a submersible vehicle (Col. 2, lines 29-33 and Col. 11, lines 7-9).

Regarding claim 3, Sonderegger discloses the plurality of acoustic sensors, the first plurality of subsystems, the first optical splitter, and the first optical combiner are configured to be positioned outboard of the submersible vehicle (between 28 (OUTBOARD) of Fig. 2), and the first optical transmitter and the first optical receiver are configured to be positioned inboard of the submersible vehicle (INBOARD, Fig. 2).

Regarding claim 4, Sonderegger discloses the optical splitter is a passive optical splitter, and wherein the optical combiner is a passive optical combiner (Col. 11, lines 10-13).

Regarding claims 5, 16 and 22, Nelson does not explicitly disclose that a duty cycle of the first set of optical pulses is about 1/(2N), where N represents the number of subsystems in the first plurality of subsystems. However, Nelson discloses sampling sensor signals from like ordered ones of channels in sequence to provide a first scan in time slots of duration proportional to ratio 1/n (Col. 25, lines 24-39). Since these sample signals are eventually transmitted as optical pulses, one of the ordinary skilled in the art would have been motivated to employ such ratio or any ratio in proportion for transmitting optical signals. Also, it would have been a matter of design choice to employ a duty cycle of 1/(2N) for optical pulses (e.g. one can choose 1/N, 1/(3N)...etc) depending on the application specification and design requirement. This support rational is based on a recognition that the claimed differences exist not as a result of an attempt

by applicant to solve a problem but merely amounts to selection of expedient known to the artisan of ordinary skill as design choice.

Regarding claims 6-7, 17-18 and 23-24, Sonderegger in view of Nelson discloses the combined modulated optical pulse stream is in a time division multiplexed format (Col. 3, lines 48-55, Nelson) and a wavelength division multiplexed format (abstract, Sonderegger).

Regarding claim 8, Sonderegger discloses all limitations as discussed above, and further discloses each subsystem in the first plurality of subsystems includes an optical modulator (36 of Fig. 2).

Regarding claim 9, Sonderegger discloses each optical modulator modulates the received stream of optical pulses by passing and blocking optical pulses in the received stream (e.g. by varying the voltage so as to keep the modulator in linear portion of its transfer function, Fig. 4 and Col. 5, line 55-Col. 6, line 37).

Regarding claim 10, Sonderegger discloses all limitations as discussed in claim 1, and further discloses a second plurality of subsystems (E-O AS_{21}, E-O AS_{22} or E-O AS_{2m} of Fig. 2), a

second optical splitter (e.g. splitter which connects $LASER_2$ and E-O AS_{21}), a second optical transmitter ($LASER_2$), a second optical combiner (e.g. combiner which connects E-O AS_{22} to $RECEIVER_{12}$) and a second optical receiver (e.g. $RECEIVER_{12}$).

Regarding claim 11, Sonderegger discloses all limitations as discussed in claims 1 and 7 above, and further discloses the second set of optical pulses having a different wavelength than the first set of optical pulses (e.g. $LASER_1$ emits λ_1 while $LASER_2$ emits λ_2); and a first optical combiner (e.g. combination of all 30 as a whole of Fig. 2).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Davis (Fig. 1, 4 and 5), Chien (Fig. 6), Medved et al (Fig. 2), Ishikawa et al (Fig. 3) and Fisher et al (Fig. 4) are cited to show optical splitter, transmitter, combiner and receiver. Nazarathy et al is cited to show analog and digital signals, modulators, splitting and summing matrix, and optical transmitter and receiver in WDM and TDM format (Fig. 9). Titterton et al is cited to show analog signals being inputted to a processor for transmission (Fig. 10).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex H Chan whose telephone number is (703) 305-0340. The examiner can normally be reached on Monday to Friday (8am to 6pm EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Alex Chan
Patent Examiner, AU 2633
January 7th, 2004

JASON CHAN
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